

NUA NEWS

Is Always Good News

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PRESIDENT'S CORNER

From Panama, a Tropical Welcome and Invitation
to Join the NWSRFS Users Association (NUA)

By: Carlos A. Vargas, NUA President

Every day, an average of thirty-six (36) ships transit the Panama Canal using about fifty-five (55) millions of gallons of fresh water per transit. Clearly, water is an important resource for the Republic of Panama. Do you know how we manage the water resources of the Chagres River, the main source of water for the Panama Canal operations?

Panamanians hydrologists, as many others around the world, have selected to use the National Weather Service River Forecast System (NWSRFS) to manage their water resources at the Panama Canal. But, you do not need to be a Water Resources Engineer working at this "Hydraulic Civil Work of the Century" to master NWSRFS! An easy way to do it, is joining the "NWSRFS Users Association (NUA)". There, you will find Americans, Canadians, Mexicans, Chinese, and many others friends who are more than willing to help you in setting-up and using this software. Just recently, several users coming from Central American Countries have joined NUA: You should be the NEXT one to join!

NWSRFS are models which can be used for flood forecasting and water management anywhere; NUA, is an international, technical, and scientific association to promote and assist in the use of such models. We invite you to join us and actively participate in all our activities, including the next International NUA Conference and Workshop which usually take place in late October each year!

At the Panama Canal, we have successfully used NWSRFS in two folds: to manage water resources during extended drought seasons (EL NIÑO) and to forecast flash floods produced by short-duration, high intensity, tropical rainfall during abnormally high rainy seasons (LA NIÑA)... and IT WORKS! At NUA, you can hear the experiences from many people around the world, including fourteen (14) River Forecast Centers (RFC) in the United States. Joining us at NUA, you will also benefit from training and you will be a member who will advise future NWSRFS development by prioritizing short and long

term needs and the feasibility of the required research and development.

NUA headquarters are located at Silver Spring Maryland, USA. There are three main constituent bodies: the General Assembly, the Board and the Secretariat. Association members may be individual persons and established bodies (governmental and non-governmental institutions, commercial companies, and professional and academic groups) involved in water resources management.

We will be waiting for your application. For more information about NUA, please visit the web, at <http://hsp.nws.noaa.gov/oh/tt/nwsgroup/nwsgroup.shtml>. For next NUA annual meeting, check <http://hsp.nws.noaa.gov/oh/tt/events/new.shtml>. For more information about the NWSRFS software, visit site <http://hydrology.nws.noaa.gov/oh/tt/soft/nwsrfs/rfsintro.shtml>. If you want to give me a chance “para converncerte”,... e-mail me at cvargas@pancanal.com. I promise you will not be disappointed; moreover, you will want to visit the Panama Canal soon to see the NWSRFS in action!

FROM THE EDITOR

Welcome

The premier issue of our NWSRFS Users Association newsletter is here. It is intended to keep you up to date on technical advances and other developments in the science, news within the Association and its membership, as well as schedules of up coming meetings and events of interest. As information provider, it is aimed at a wide audience. Your comments, suggestions or any other input of interest are always welcomed.

Conference Summary

General Jack Kelly, the Assistant Administrator for Weather Services delivered the opening address in welcoming participants to the first conference and workshop of the NWSRFS Users Association (NUA) was held October 10-12, 2000, in Silver Spring, Maryland USA. Close to one hundred participants from the United States and fourteen foreign countries, representing government, private industry and international organizations were in attendance. These participants compose a cross section of current and potential users, members of the research and development community, as well as sponsors, donors and lenders. A set of draft bylaws was formally approved and adopted as an operational basis for the organization. It stated the purpose of the organization “to promote and assist in the management of water resources through real time forecasting and decision making”. The following officers were elected to the Executive Board:

President	Mr. Carlos Vargas, Panama Canal Authority
Vice President	Dr. Jaromir Nemec, Czech Hydrometeorological Institute

Vice President
Secretary

Mr. Richard Paulson, Program Management Associates Inc. USA
Vacant (Any Volunteers?)

The Executive Board is now in the process of establishing the various committees to assist in running the organization. A newsletter, of which this is the first issue, will keep members current about all relevant issues and happenings.

A large variety of technical topics, presented at both the introductory and advanced levels to accommodate the cross section of participants, describing the current state of the art, as well future advances under development, were covered. These includes a detailed coverage of the NWSRFS; radar and satellite data usage in precipitation estimates; and hydrological and meteorological data acquisition, communications and management. A special session was devoted to projects currently in progress in several counties, covering both the technology and finances of the effort. Issues in building operational forecast centers, from mission definition to personnel recruitment and training requirements were discussed by panels representing the National Weather Service (NWS), the US Geological Service (USGS) and the Federal Emergency Management Administration (FEMA), as well US Agency for International Development (USAID), Office of Foreign Disaster Assistance (OFDA), The World Bank, and the Inter American Development Bank.

A visit to the Middle Atlantic River Forecast Center in State College, Pennsylvania on the final day of the conference enabled participants to witness the application of the science and technology in real time.

Put the following dates on your calendar

**WHAT: The next NUA Workshop and
Conference**

WHEN: October 29 - November 1, 2001

WHERE: Silver Spring, Maryland USA

Program is being prepared and will be distributed shortly.

Stay tuned for details.

National Weather Service River Forecast System Hydrology Projects Summaries Around the World

Flood forecasts protect life and property for the population residing within river floodplains while daily river forecast services provide for economic and environmental well being through improved water resources management. In the past twenty years a sizable ongoing technology effort has been expended to develop and maintain a state-of-the-art flood and river forecast system. This involved improvements in data collection techniques using line of sight radio, meteorburst and satellite platforms, replacement of obsolete radars with state of the art Doppler systems, automation of the hydrometeorological observing systems, improvements in atmospheric models and quantitative precipitation prediction (rainfall forecast methods), improved technology in the use of satellites to estimate rainfall and sense the earth's surface and atmosphere. These coupled with improvements in hydrologic modeling and forecasting systems, and improvements in computer hardware, software and overall telecommunications has resulted in a world class state of the art forecast service.

The NWS has developed the National Weather Service River Forecast System (NWSRFS) which is a sophisticated software system to provide the basis for hydrologic forecasts nationally. NWSRFS is a collection of interrelated software procedures that perform wide variety of hydrologic/hydraulic and data management operations. It is a modular system that can be implemented in river basins with various hydrologic and climatic characteristics. In the United States, the NWSRFS is used to make short-term (a day to a week) forecasts of rivers and floods, and long-term (as many as three months) probabilistic river forecasts in support of water-supply management. The operational NWSRFS contains numerous hydrologic models that are used for forecasting across the wide range of hydrometeorologic conditions. The NWSRFS computer code and documentation are available on the Internet and may be downloaded at no cost. However, the system is highly sophisticated and requires:

1. extensive training in hydrometeorological data analysis, model calibration, system initialization and operations;
2. calibration of hydrologic models and initialization the NWSRFS for the selected river basins;
3. computer workstation resources; and
4. possible strengthening of data-collection and forecast dissemination programs to achieve the full benefit of this technology.
5. Establishing an operations concept and linked to users

In addition for dam break flood forecasting, the FLDWAV model has been developed to simulated flooding in flat large rivers that experience back water, have levees, locks and dams. FLDWAV, can be use as a stand alone or in conjunction with the NWSRFS.. The NWS International Activities (IA) Office manages programs to transfer and adopt the system and associated technologies to foreign countries . NWSRFS technology continues

to develop as the NWS enhances the system to meet domestic and international needs.

Transfer of the NWS Technology to Other Countries



Many countries suffer from the effects of droughts and floods. The rapid population growth coupled with a limited supply of fresh water is causing water scarcity around the world. Effective water-management technology is critical in many areas in the world where water problems are severe constraints on economic and social development. The growing need for water-management support technologies is creating a demand for river forecasting. This need for information and forecasts has created a demand for the NWSRS technology. The NWS International Activities (IA) Office, in cooperation with the World Meteorological Organization, the US Agency for International Development, the World Bank, United Nations Development Programme, and other donor organizations is transferring this technology to many countries in the world where water shortages or floods threaten life and economic well being. The NWS works closely with other US government agencies and the private sector to transfer technology via major projects to hydrometeorological partners in other countries. In the coming issues of this newsletter descriptions of projects in several countries will be presented. The first in this series describes the effort in Mexico and Panama.

México

The Comisión Nacional del Agua (CNA) and the NWS agreed to a multi-year project that transfers NWS River Forecasting System (NWSRFS) and associated technologies to Mexico. The principal goal of the CNA-NWS project is to provide CNA staff with the training and practical experience needed to implement river forecasting and associated technologies that are needed to mitigate the loss of life and property caused by floods and



to improve the management of water resources. Project activities are defined annually and are supported by the World Bank through the Programa de Modernización del Manejo del Agua (PROMMA.)

The CNA-NWS project provides its Mexican counterparts with capacity development and on-the-job experience needed to implement the NWSRFS in selected river basins throughout México that represent a variety of climatic and hydrologic settings.

Capacity development of CNA staff is intended to assist CNA implement the forecast system in other river basins in México.

A major contribution of the project in 1999 and 2000 is the strengthened cooperation by the US and México in forecasting and management of the Río Bravo, their common boundary river. The Comisión Internacional de Límites y Aguas (CILA) and the International Boundary and Water Commission (IBWC) are cooperating on the

establishment of real-time exchange of hydroclimate data and associated information between the two countries. The purpose of this effort is to improve Río Bravo forecasting by Mexican and United States forecast centers in Monterrey, Nuevo León, and Fort Worth, Texas, respectively.

The principal partner of the NWS in this project is the CNA Gerencia de Aguas Superficiales e Ingeniería de Ríos (GASIR), which is responsible for monitoring and managing Federal rivers and reservoirs in México. From 1996 through 2000, the NWS and GASIR have implemented the NWSRFS in the Ríos Fuerte, Yaquí, Bravo, and Pánuco basins. To implement these basins, CNA engineers were trained in hydroclimate data analysis, model calibration, and NWSRFS operation and maintenance. Training of CNA engineers and cooperative development of these systems is essential to supporting the technology as CNA assumes operational responsibility for them. To assist CNA support of the systems, the NWS also is translating NWSRFS manuals into Spanish.

During the last four years, GASIR and NWS also have evaluated and implemented associated technologies in support of NWSRFS implementation. GASIR and Gerencia de Servicio Meteorológico Nacional (GSMN) operate data collection networks in México which need to be strengthened and integrated with the forecast system. GASIR and GSMN are in the process of automating their networks and their data will be used to enhance operation of the forecast system in the river basins. Two potential additional sources for estimation of precipitation, using radar and satellite also were evaluated with the assistance of the Instituto Mexicano de Tecnología del Agua (IMTA).

One of the principal goals of PROMMA is to decentralize the management of water in México. Towards this goal, the NWS assisted CNA begin to establish Regional River Forecast Centers (RRFC's) in two CNA regions and developed database and Internet-based systems to store and exchange information and data between RRFC's and CNA headquarters. In 1999, the CNA Noroeste Region RRFC in Hermosillo, Sonora, started to test database and data transfer systems and operate the Ríos Fuerte and Yaquí NWSRFS. The river forecast systems are called Sistema de Pronóstico en Ríos de la CNA (SPRCNA) when they became operational by CNA.

To strengthen the capacity of CNA, the NWS conducted hydrologic study tours to the United States for CNA managers. The NWS also conducted workshops on the NWSRFS, application of Geographic Information System (GIS) technology for flood inundation mapping, and reservoir Decision Support Systems (DSSs), which were attended by CNA staff, and several US government and private organizations. In 2000, GASIR and NWS are developing the use of GIS to visualize the extend of flooding in the Tampico area. In addition, GASIR and NWS compared current forecast models in México to models in the NWSRFS to evaluate the advantages and benefits of the models. The cooperation between NWS and CNA is scheduled to continue until 2005.

Panama



The basic objective of the project was to provide technical assistance to the Panama Canal Authority (PCA) to implement the NWSRFS and its components as designed specifically for the Panama Canal. This objective met the requirements of the Interagency Agreement. On December, 1998 December, the NWS installed and tested River Forecast System for PCA's Meteorological and Hydrographic Branch.

The funding for the project was provided through the Interagency Service Agreement Between the PCA and the United States Department of Commerce, NOAA, NWS for the Provision of Services to Establish National Weather Service River Forecast System for the Panama Canal Watershed for use by the PCA as executed on August 28, 1996

(Interagency
amendment
PCA to
lockage



Agency Agreement) and any supplements or amendments. The NWSRFS is now used by the NWS to operate Madden Reservoir which supplies water for the Panama Canal.

NWSRFS Software Update

Release 17 NWSRFS

Release 17 of the NWSRFS was used as the basis for a contracted port of the HP-UX 10.2 NWSRFS and the NWS Informix Database to a Windows 2000/SQL platform. The W2K port of the NWSRFS was developed for the Mitch Reconstruction Project in Nicaragua, and has been run successfully on desktops and even

laptops. Required software to run the port currently includes Windows 2000 Professional, Hummingbird Exceed Version 6.2, and Active Perl 5.6.0 with W2K Extensions. The database engine is not required for running NWSRFS, but as an option, would require Microsoft SQL Server 2000.

Release 17 will also be used on its native HP-UX 10.2 platform in other Central American countries as part of the National Weather Service's Mitch Reconstruction Project activities. In addition to its promise of offering a more affordable alternative to the high investment in hardware, software, training, and maintenance required by an HP implementation, the W2K port, and Linux port testing (see below) also proved valuable in providing information for identification of minor bugs that were fixed in the subsequent release (HP-UX Release 18).

NWS hopes to make source code and executables for the Windows 2K port of NWSRFS

Release 17 publically available soon.

Release 18 NWSRFS

Source and Executables for Release 18 of the NWSRFS on the HP platform are now available on the International Activities Hydrologic Technology Transfer FTP site. Release 18 (or Release 19) is likely to be used in the Aral Sea Project. Release 18 has been installed on an HP-UX 10.2

B2000 system destined for Tashkent, Uzbekistan. Mexico will also be using the new Release 18. New in Release 18 is the use of the HP Fortran 90 Compiler. Another new compiler was used in Release 17, the GNU C/C++ gcc is available free of charge from the Free Software

Foundation <http://www.gnu.org>

As usual, each new release fixes some bugs, and adds some new features.

Highlights of Release 18 include:

1. The network and mudflow options have been made available in the FLDWAV operation.
2. Two new programs have been added for ensemble forecasting. The first is an ensemble preprocessor calibration program and the second is an ensemble postprocessor (error model) calibration program. Draft documentation is included in the release.
3. Fixes and cleanups arising information provided by several NWSRFS porting projects including the:
 - Port to the HP-UX 10.2 Fortran90 compiler
 - AHPS related work to port to Linux operating system
 - Technology Transfer Port to Windows 2000

More information on Release 18 is available in the Release Notes on our FTP Site:

<ftp://www.nws.noaa.gov/oh/tt/pub/rfs/REL.010102.NWSRFS>

Other News:

For the Mitch Reconstruction in El Salvador, a Hewlett Packard B2000 HP-UX 10.2 has been loaded with NWSRFS Release 17 and configured to run HP-UX with a Spanish locale. The Spanish locale provides users some HP-UX system help and messages in Spanish. Unfortunately, Hewlett Packard has yet to provide complete documentation of its Operating System in Spanish. In addition, the El Salvador HP B2000 system has been successfully configured to run SAMBA. SAMBA is free software that allows a UNIX system

to function as a file, print, and login server or client for Windows PCs on the same LAN (W2K, NT, W9*). See <http://www.samba.org/> Using SAMBA, and X-Windows emulator packages, that provide a PC interface to the NWSRFS software running on the HP B2000 Unix system,

El Salvador hopes to integrate the new workstations in its LAN to provide

maximum access and benefit to its organization. The entire package of Word Perfect NWSRFS Documentation in Spanish is available as GZIP TAR at ftp://www.nws.noaa.gov/oh/tt/pub/rfs/ES_users_manual_tar.gz and Windows ZIP at ftp://www.nws.noaa.gov/oh/tt/pub/rfs/ES_users_manual_tar.gz. In addition, individual documents are available for download one-at-a-time from: http://hsp.nws.noaa.gov/oh/tt/DOCS/ESPrfsdoc/users_manual/html/spxrfsdocwpd.htm

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